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SOY BEANS AS A COMPONENT OF A BALANCED DIET AND HOW TO PREPARE THEM

By MARIA Y. OROSA

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SOY BEANS AS A COMPONENT OF A BALANCED DIET AND HOW TO PREPARE THEM

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WITH THE ASSISTANCE OF THE MEMBERS OF THE DIVISION

INTRODUCTION

The soy bean is also known as soya bean or soja bean. In botany it was referred to as *Glycine hispida,* but now the botanical name of the plant has become *Glucine max,* under the international rules of botanical nomenclature. It has been known in China and Japan for several thousand years. Adolph and Kiang [1] state that the use of the soy bean in China dates back to the beginning of China's agricultural age under the emperor Shen Nung and that it is mentioned in the Ben Tsao Yang Mu written by Shen Nung in the year 2838 B. C.

The soy bean is a native of eastern Asia. When and by whom the soy bean was first introduced into the Philippines, no one can ascertain. The Filipino people have long known some important soy-bean preparations, such as soy sauce, or "toyo," bean curd, or "tokua," fermented bean curd, or "tahuri," not knowing that they were prepared from this bean. The seed is known in some parts of the Philippines, where it is grown, as "utao."

Since 1880 the soy bean has been a farm crop in the United States but during the early years of its introduction it was utilized only as a forage crop. Later the value and uses of the oil became known both in America and Europe. Due to the scarcity of cottonseed and linseed oil, coupled with proof that the soy bean is easy to grow, easy to harvest, easy to handle, and is not as easily attacked by insects as other seeds, America

[1] The Nutritive Value of Soy-bean Products, Nat. Med. Journ. 5 (1919) 40–49.

and Europe began to devote more attention to the growing of the soy bean for its oil. The meal is used as animal food and as fertilizer. The oil is now used in the manufacture of soap, paint, candles, artificial rubber, linoleum, water-proofing, liquids, enamels and waterproof goods, such as cloth, umbrellas and lanterns, lacquer for varnish and printing ink, and in the manufacture of certain foodstuffs, as salad oil and butter substitutes. Baked soy beans, pork and bean style; soy-bean flour; and soy-bean meal are now being put on the market by American and European industries.

The soy bean for several thousands of years has been utilized by the Chinese and Japanese as food. Some of the soy-bean preparations are consumed in these countries three times a day. The Chinese people do not use dairy products and most of them consume only a small amount of meat. Despite these facts, the Chinese people have lived for centuries on what appears to be a well-balanced diet through the use of the soy bean.

The main object of this pamphlet is to encourage the Filipino people to use more soy beans, and preparations made from them, as food. It is an accepted belief that Filipinos do not eat a well-balanced diet. One reason for this is the limited earning capacity of many of us, which prohibits the purchase of foods that have the necessary proteins and fats, such as meat, eggs, milk, etc. Rice, which is mostly starch, and on which many of us depend for our living, cannot supply our bodies with the proteins and fats necessary for health. Meat or some other source of protein must be obtained by the body for the building of tissues, and the rebuilding of the wear and tear of fatigue. To those people who cannot well afford to eat expensive protein and fat products, on account of their limited income, we strongly suggest the liberal use of soy beans in their diet. Experiments by different food experts indicate that 20 per cent soy beans and 80 per cent rice make a well-balanced diet as far as protein and fat are concerned.

There is a wide belief, however, that a diet should not consist entirely of concentrated foods, as would be the case with a rice-

soy-bean diet, but that it should be supplemented by bulky materials such as vegetables. At any rate, it would seem advisable to use leafy vegetables as a source of vitamins and necessary mineral salts.

In considering the food value of the soy bean, Daniels and Nichols,[2] and Osbourne and Mendel [3] found that it averages a high percentage of physiologically useful protein, a considerable amount of energy-yielding fat and carbohydrate, and sufficient fat-soluble vitamin A and water-soluble vitamin B. In addition to the fact that the soy bean is rich in protein, this protein, unlike that of all other vegetables, is similar to animal protein or to the protein of the human body. The different kinds of protein contain a number of different amino acids. Generally, plant proteins seem to lack some of the active amino acids, and the soy bean is an exception. McCollum says, "Its proteins which are adequate when fed at a plane corresponding to 17 per cent or more of the diet, can support growth when they form the sole protein supply." Horvath says, "The soy-bean protein is a complete protein containing all the essential amino-acids necessary for the building up of the protein of the human organs."

Science has found that besides carbohydrates, fats, proteins, and minerals, the body needs substances called vitamins. Bureau of Science tests have shown that polished rice, which most of us eat, is deficient in vitamin B. McCollum found it deficient in vitamin A. Horvath found the soy bean to contain vitamins B and B_2, also called F and G. Other investigators found vitamins A, D, E, and C.

While the addition of soy beans to rice would add vitamins to the diet and considerably improve its quality, particularly in reference to the deficiency of vitamins A and B, it would probably be better not to depend entirely on soy beans and rice for vitamins, but to add fruits and vegetables, particularly leafy vegetables. However, the addition of soy beans would probably

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[2] Journ. Biol. Chem. 32 (1917) 91.

[3] Proc. Soc. Exp. Med. 14 (1917) 174; Journ. Biol. Chem. 32 (1917) 369.

improve the vitamin content of the diet of most of the poorer classes and make it possible for them to secure such additional vitamins at a nominal cost.

Soy-bean flour is now being prepared by several factories in Europe and America and is especially valuable for diabetic patients, as it contains only a very small percentage of starch.

Soy-bean milk is used in China much as cow's milk is used in the United States. Preparations requiring milk can be successfully made by using soy-bean milk instead of canned milk or fresh cow's or carabao's milk. In the Philippines where there is a scarcity of fresh milk and where the milk, both fresh and canned, is high in price, the use of soy-bean milk will be very beneficial.

In considering a suitable diet for the poorer classes, the question of price must always be one of paramount importance. The beans which we have used in our experiments were bought in the open market at less than the current price of rice. If they were grown or imported in larger quantities they would probably be cheaper than they are at present, and substituting part of the rice in the diet by soy beans would not increase the price of the diet.

Soy beans are grown in some parts of the Philippines. According to Doctor Roxas, Director of the Bureau of Plant Industry, 2,481 tons were grown in Batangas in 1921 and 4,218 tons, in 1930. However, the importation of soy beans in 1924 was 4,657 tons. Doctor Roxas states that soy beans can be grown in all parts of the Philippines. Fortunately, the Director of the Bureau of Plant Industry assured us of his coöperation in popularizing soy-bean planting throughout the Archipelago. It is, therefore, hoped that with his coöperation our demonstration campaign to teach the public the proper methods of cooking soy beans will result in this article of diet being widely and liberally used by the Filipino people as a means of improving health and lessening disease. Let us keep in mind the saying, "An ounce of prevention is worth a pound of cure."

In order to give the reader an idea of the food value of the soy bean, Table 1 shows the composition of soy beans and of some of the most nourishing common foods.

TABLE 1.—*Comparison of the food values of soy beans and other common foods.*[a]

Name of food.	Protein.	Fat.	Carbohydrates.	Ash.	Water.	Calories per pound.
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	
Soy bean	34.00–40	16.8–20	33.7	4.7	10.8	1,970
Mung bean (*mongo*)	23.8	2.0	59.0	3.8	11.4	----------
Rice	8.0	2.0	77.0	1.0	12.0	1,720
Corn	10.0	4.3	73.4	1.5	10.8	1,800
Navy bean (*habichuelas*)	22.5	1.8	59.6	3.5	12.6	1,605
Peas	24.6	1.0	62.0	2.9	9.5	1,655
Lima bean (*patani*)	18.1	1.5	65.9	4.1	10.4	1,625
Wheat	12.2	1.7	73.7	1.8	10.6	1,750
Eggs	14.8	10.5	--------	1.0	73.7	720
Beefsteak	18.6	18.5	--------	1.0	61.9	1,130
Porkchops	16.9	30.1	--------	1.0	52.0	1,580
Peanuts	25.8	38.6	24.4	2.0	9.2	2,560

[a] Compiled from different sources.

THE COOKING OF SOY BEANS

Immature soy beans may be cooked in the same way as lima beans (*patani*). The matured beans are hard and like many beans of similar texture they require thorough soaking (about 3 hours). We have found that soaking longer than five hours often results in a longer cooking period being necessary to soften the beans. If, after soaking, the beans are merely placed in water and boiled, it will take some time to cook the beans thoroughly soft. However, if the soaked beans are ground fine they can be cooked in a short time. Ground beans can be mixed with rice in any desired proportion and cooked with the rice or added to soups or stews.

The time necessary to soften whole beans can be reduced somewhat by adding table salt to the water they are cooked in. The most convenient method of cooking would be, of course, to use a pressure cooker, but since this is not usually found in the

ordinary home, we devised the following substitute method which is simple, cheap, and very satisfactory.

Wash the soy beans thoroughly with water.

Soak from 3 to 5 hours.

Place in water containing a small amount of salt (⅔ tablespoonful salt to 1 quart of water) and bring to a boil.

While boiling transfer to a mason jar and half seal the jar.

Place the jar in a pan containing a boiling saturated solution of salt. The pan should be provided with a rack to prevent contact of the jar with the pan. Boil for 3 hours or more.

SOY BEANS BOILED WITH RICE, I

⅓ cupful soy beans (soaked 3 hours)
⅔ cupful rice
1 cupful water

Pass the soaked soy beans through a meat grinder and add this to the rice previously washed with water. Add 1 cupful of water and a few pinches of salt and boil slowly in a covered pan until the water has dried out.

SOY BEANS BOILED WITH RICE, II

⅓ cupful soaked soy beans (not ground)
⅔ cupful rice
2 cupfuls water
A few pinches of salt

Boil the soy beans, water, and salt together in a covered pan until the water has all dried out.

SOY BEANS BOILED WITH RICE, III

½ cupful soaked soy beans (ground)
½ cupful rice
A few pinches of salt
1 cupful water

Proceed as in Recipe No. I.

SOY BEANS BOILED WITH RICE, IV

½ cupful soaked soy beans (not ground)
½ cupful rice
2 cupfuls water
A few pinches of salt

Proceed as in Recipe No. II.

ROASTED SOY BEANS

Roast the soy beans with a small quantity of lard and when well brown and crisp sprinkle over them a small quantity of salt.

SOY-BEAN BRITTLE

⅔ cupful roasted soy beans
1 cupful sugar
A few drops of vanilla extract

Melt the sugar in a pan with the aid of a low fire. Increase the heat until the sugar boils. Add the roasted soy beans and mix well. Pour on a buttered board and press the mass with a rolling pin to a thickness of ¼ inch. Cut with a knife in desired pieces. Lard may be used in place of butter.

SOY-BEAN SOUP No. I

1 cupful boiled soy beans
3 cupfuls water
¼ teaspoonful pepper
1 teaspoonful salt
1 tablespoonful kinchay, cut in small pieces (native celery)

Pass the boiled soy beans through a sieve. Add the water, salt, and pepper, and boil until the soup is somewhat thick. Add the kinchay leaves and boil 2 minutes.

SOY-BEAN SOUP No. II

1 cupful boiled soy beans
3 cupfuls water
3 tablespoonfuls tomato paste
5 pinches pepper
⅓ teaspoonful salt

Mash the soy beans and pass through a sieve. Add the water and boil 15 minutes in a closed pan. Add the tomato paste, salt, and pepper, and boil until the soup thickens.

SOY-BEAN SOUP No. III

1 cupful boiled soy beans
⅓ teaspoonful salt
5 pinches pepper
3 cupfuls water
A small piece of ham or bacon
A few kinchay leaves

Mash the soy beans and pass through a sieve. Add the water, salt, pepper, ham, and boil until the soup thickens.

Remove the ham and drop in a few leaves of kinchay (native celery) and boil 1 minute.

SOY-BEAN SOUP No. IV

1 cupful boiled soy beans
3 cupfuls water
½ teaspoonful salt
1 teaspoonful sugar
5 tablespoonfuls coconut cream

Mash the soy beans and pass through a sieve. Add the salt, sugar, and water, and boil until the soup thickens. Take the pan off the fire and add the coconut cream to the soup just before serving.

SOY-BEAN SOUP No. V

1 cupful boiled soy beans
3 cupfuls water
3 tablespoonfuls finely chopped red sweet pepper
1¼ teaspoonfuls salt
1 teaspoonful chopped onion
A few pinches of pepper

Mash the soy beans and pass through a sieve. Add the salt, pepper, water, and boil until the soup thickens. Then add the finely chopped sweet pepper, chopped onions, and boil 5 minutes longer.

SOY-BEAN SOUP No. VI

½ cupful boiled soy beans
2 cupfuls soy-bean milk
½ tablespoonful flour
1 tablespoonful butter
⅛ teaspoonful pepper
⅔ teaspoonful salt

Make a sauce from the butter, flour, and soy-bean milk by browning the flour in the butter, adding to it the salt, pepper, and milk. Stir constantly while the milk is being added to prevent lumping. Cook the mixture about 5 minutes. Mash the boiled soy beans and pass through a sieve. Add this to the soup and cook until the soup thickens.

SOY-BEAN SOUP No. VII

1 cupful boiled soy beans
2 cupfuls milk, or coconut milk
3 tablespoonfuls butter
1 onion, finely chopped
1 teaspoonful chopped kinchay (native celery)
1 teaspoonful salt
¼ teaspoonful pepper
1 cupful water

Melt the butter and fry the onion and kinchay. Add the soy beans, pepper, salt, and water, and boil 15 minutes in a covered

pan. Mash and pass through a sieve. Add the coconut milk and boil again until the soup thickens.

SOY-BEAN SOUP No. VIII

1 cupful soy-bean milk
3 tablespoonfuls boiled soy beans
2 tablespoonfuls chopped shrimps
1 tablespoonful tikitiki flour (darak)
1 tablespoonful lard
¼ onion
2 sections garlic
½ teaspoonful salt
2 pinches ground pepper

Pound together in a mortar the boiled soy beans, shrimps, ⅛ of a medium-sized onion, and one section of garlic. Season with ¼ teaspoonful of salt and a pinch of pepper. Stir the tikitiki flour into the mixture and form it into small balls. Fry the balls in hot fat until brown.

Make the shrimp soup from the head and shell of the shrimps, by pounding them in a mortar, adding to them about ½ cupful of water, boiling it slowly about 5 minutes, and straining it through a sieve.

Sauté in the lard the remaining garlic and ⅛ of an onion, both chopped very fine, and when brown add the shrimp soup. Boil a few minutes and add the soy-bean milk. Season with the rest of the salt (¼ teaspoonful) and pepper (a pinch) and boil 5 minutes longer.

Drop the balls in the soup just before serving.

SOY-BEAN SOUP No. IX

½ cupful boiled soy beans
¼ cupful fresh leaves of pepper (capsicum)
¾ cupful rice washings (rice water)
1 tablespoonful fish sauce (patis)
2 tablespoonfuls lard
2 sections garlic, chopped fine
2 tablespoonfuls chopped onion
1 tablespoonful ginger, cut in small pieces

Fry the garlic, ginger, and onion in lard until brown. Add the patis and cook 1 minute. Then add the rice washings and boil for 4 minutes. Lastly add the boiled soy beans and the fresh leaves of pepper and continue boiling 5 minutes longer.

SOY-BEAN-ALUGBATI-LEAVES SOUP No. X

½ cupful boiled soy beans
1 cupful young leaves of alugbati
2 tablespoonfuls chopped pork
½ onion, chopped
2 sections garlic, chopped
2 tablespoonfuls lard
1 teaspoonful salt
2 cupfuls coconut milk
1 cupful shrimp soup

Fry the garlic, onion, and pork in lard. Pour the shrimp soup in the same pan and let boil. While boiling add the coconut milk, soy beans, salt, and the alugbati leaves. Boil for 2 minutes.

SOY-BEAN SOUP WITH DUMPLINGS No. XI

1 cupful boiled soy beans
2 tablespoonfuls butter
2 cupfuls water
¼ teaspoonful salt
A few pinches of pepper

Mix the above and boil 5 minutes.

Mix the following:

¼ cupful soy-bean milk
½ teaspoonful butter
⅛ teaspoonful salt
2½ tablespoonfuls flour
1 egg

Boil the milk, butter, and salt, and while hot, add the flour at once. Take the pan from the fire and stir very rapidly to avoid lumping. Put the pan back on the fire and cook the dough a few minutes longer. When the dough is thoroughly cooked cool it about 1 minute. Mix with it 1 whole egg and drop the dumplings by ½ teaspoonfuls in the boiling soup. Cook the dumplings in the boiling soup 2 minutes.

SOY BEANS WITH BAGOONG

1 cupful boiled soy beans
½ onion, cut fine
1 tablespoonful bagoong (salted, fermented fish)
1 section garlic
2 tablespoonfuls vinegar
2 tablespoonfuls lard

Sauté the garlic and onion in lard. Add the bagoong to the vinegar and add this mixture to the pan containing the garlic and onion. Boil, without stirring, 2 minutes. Lastly add the soy beans and continue the cooking 2 minutes longer.

SOY BEANS WITH ALAMANG

¾ cupful boiled soy beans
¼ of an onion, chopped
1 section garlic
1 tablespoonful lard
1 tablespoonful alamang (salted, fermented shrimp)

Sauté garlic and onion in lard. Add the alamang and soy beans, and cook in a covered pan for 2 minutes.

SOY-BEAN PINAKBET

½ cupful boiled soy beans
1 cake tokua, sliced
1 eggplant, sliced to small pieces
½ ampalaya, sliced thin, crosswise
A small piece of pork cut in small pieces
2 medium-sized tomatoes, sliced fine
1 tablespoonful bagoong
1 cupful rice water

Cook the tomatoes, bagoong, and pork, then add the soy beans, tokua, and rice water, and boil 3 minutes. Lastly add the vegetables and cook until the vegetables are tender.

SOY BEANS WITH VEGETABLES

1 cupful boiled soy beans
1 tokua cake, sliced
4 tablespoonfuls sliced patola
6 tablespoonfuls sliced upo
½ eggplant, sliced
6 tablespoonfuls cabbage, sliced
2 tablespoonfuls garlic, chopped
4 tablespoonfuls onion, sliced
4 tablespoonfuls pork, sliced to small pieces
2 tablespoonfuls shrimp, sliced into small pieces
6 teaspoonfuls toyo
½ cupful shrimp soup
2 tablespoonfuls lard

Fry the garlic in lard until brown. Add the onion and fry again. Add the pork, tokua, and shrimp, and continue cooking 3 minutes. Then add the soy beans, and the vegetables and continue cooking for several minutes. Finally add the shrimp soup and toyo sauce and boil 5 minutes.

TOKUA WITH KINCHAY

3 tokua cakes cut to small cubes
½ cupful kinchay stems cut to ½ inch long
1 teaspoonful salt
A small piece of pork cut in small pieces
1 section garlic, chopped fine
¼ onion, cut fine
3 tablespoonfuls lard

Fry the garlic, onion, and pork in lard. Add the tokua and salt, and cook 3 minutes longer. Then add the kinchay and cook 1 minute more.

SOY BEANS WITH KANGKONG

¾ cupful boiled soy beans
2 cupfuls kangkong leaves and stems, cut to small pieces
¾ tablespoonful alamang
½ cupful rice water
1 tablespoonful coconut oil
2 sections garlic, chopped

Fry the garlic in oil. Add the soy beans and alamang, and cook, stirring constantly. Then add the kangkong leaves and stalks, and water. Cover the pan and boil 10 minutes, or until the kangkong is tender.

SOY BEANS WITH SQUASH

¾ cupful boiled soy beans
1 cupful sliced squash
1 tablespoonful lard
1 section garlic, chopped
½ cupful water
½ teaspoonful salt
⅛ teaspoonful pepper

Fry the garlic in lard until brown. Add the squash, water, salt, and pepper, and cook covered. When the squash is tender, add the boiled soy beans and boil 5 minutes.

SOY BEANS WITH SQUASH AND SOY SAUCE

½ cupful boiled soy beans
½ cupful sliced squash
1 onion, cut fine
3 sections garlic, chopped
2 tablespoonfuls toyo
½ cupful water
2 tablespoonfuls lard

Sauté in lard the garlic, onion, soy beans, and squash. Add the toyo and water, and boil until the squash softens, and the soup thickens.

SOY BEANS WITH SQUASH LEAVES

1 cupful boiled soy beans
1 cupful sliced leaves of squash
2 sections garlic
½ onion, sliced
1 cupful rice water
2 tablespoonfuls coconut oil
2 tablespoonfuls alamang (fermented, salted shrimp)

Sauté the garlic, onion, and alamang, in oil. Add the soy beans and the squash leaves (use only young tender leaves) and continue cooking 5 minutes. Finally add the rice water and let the mixture boil for from 10 to 15 minutes.

SOY BEANS WITH MALUNGAY LEAVES

½ cupful boiled soy beans
1 cupful malungay leaves
1 tablespoonful bagoong
1 cupful water
1 section garlic
1 tablespoonful lard

Brown the garlic in lard and add the bagoong; fry 1 minute. Add the water and soy beans and boil 5 minutes. Lastly add the malungay leaves and boil 2 minutes more.

SOY BEANS WITH AMPALAYA LEAVES

¾ cupful boiled soy beans
1 cupful of ampalaya leaves
1 tablespoonful lard
2 sections garlic, chopped
½ onion, chopped fine
1 tablespoonful tomato sauce
½ cupful water
Salt to taste
A few pinches of pepper

Select the young leaves of the ampalaya and soak in water. Fry the garlic, onion, and tomato sauce in lard. Add the water, salt, pepper, and soy beans, and cook 5 minutes. Then add the ampalaya leaves and cook 3 minutes longer.

SOY BEANS WITH HEART OF BANANA (BANANA FLOWER)

¾ cupful boiled soy beans
2 cupfuls heart of banana, sliced to very fine, long pieces
¼ tablespoonful alamang
¼ onion, sliced thin
½ cupful rice water
2 sections garlic
1 tablespoonful lard

Saute the garlic and onion in lard. Add the heart of banana previously worked with coarse salt and pressed, and fry 5 minutes more. Then add the alamang, soy beans, and rice water, and cook 5 minutes.

SOY BEANS WITH BANANA FLOWER AND COCONUT MILK

1 cupful boiled soy beans
1 cupful coconut milk
1 cupful finely sliced banana flower
4 sections garlic
A small piece of ginger
2 tablespoonfuls bagoong (salted, fermented fish)
¼ cupful coconut cream

Boil the coconut milk, with bagoong, garlic, and ginger. Work the banana flower with coarse salt and wash the salt out with cold water. Add this, together with the soy beans, to the boiling coconut milk and continue cooking until the soup is practically dried out. Then add ¼ cupful coconut cream and let the mixture boil not longer than 3 minutes.

SOY BEANS WITH PATOLA

½ cupful boiled soy beans
1 cupful sliced patola
¼ cupful pork, sliced
¼ cupful sliced shrimp
2 tablespoonfuls chopped tomatoes
2 tablespoonfuls chopped onion
1 tablespoonful chopped garlic
1 tablespoonful toyo
1 cupful shrimp soup
2 tablespoonfuls lard

Sauté the garlic, onion, and tomatoes in lard. Add the shrimp, pork, and toyo sauce, and cook 3 minutes. Add the shrimp soup and heat to boiling. Then add the patola and soy beans and cook until the vegetable is tender.

SOY BEANS WITH SWEET POTATO AND COCONUT MILK

¾ cupful boiled soy beans
½ cupful coconut milk
1 small sweet potato, boiled and cut into small cubes
1 tablespoonful lard
2 sections garlic, chopped fine
½ teaspoonful salt
½ teaspoonful sugar

Fry the garlic in lard. Add the soy beans, sweet potato, salt, sugar, and the coconut milk, and boil 5 minutes.

SOY BEANS WITH LETTUCE

1 cupful boiled soy beans
1 head of native lettuce
¼ cupful milk
1 egg yolk
1 tablespoonful butter
½ teaspoonful sugar
¼ cupful water
½ teaspoonful salt

Wash the lettuce well, put in a stewpan with the boiled soy beans, butter, water, and salt, and cook about 5 minutes. Remove the lettuce, and spread the leaves on a plate.

Mix the milk and the egg yolk, and add this to the contents of the stewpan. Add the sugar, and cook slowly 5 minutes, stirring constantly. Pour over the plate on which the lettuce leaves are spread.

SOY BEANS WITH GREEN ONION LEAVES

¾ cupful boiled soy beans
2 tablespoonfuls chopped green onion
2 tablespoonfuls sliced pork
1 tablespoonful chopped shrimp
1 section garlic, chopped fine
2 tablespoonfuls chopped onion
Salt and pepper to taste
1 tablespoonful lard
½ cupful shrimp soup

Fry the garlic, onion, pork, and shrimp in lard. Add the soy beans, salt, and pepper and continue cooking a few minutes. Then add the green onion and the shrimp soup and boil until only a small amount of soup remains.

SOY-BEAN GUINATAAN

¾ cupful boiled soy beans
6 ripe guavas, peeled and sliced
1 medium-sized sweet potato, boiled and sliced into small cubes
1 cupful coconut milk
¼ cupful coconut cream
½ cupful sugar
1 pinch salt

Place the sliced guavas and soy beans in a pan. Add the coconut milk, and boil a few minutes. Then add the sweet potato and continue boiling 5 minutes. Add the sugar, salt, and the coconut cream, and boil ½ minute.

SOY-BEAN KILAWIN

¼ cupful chopped soy beans
¼ cupful sliced pork
1 small raddish, sliced fine
2 sections garlic, chopped
2 tablespoonfuls lard
3 tablespoonfuls vinegar
1 teaspoonful salt
A pinch of ground pepper
¼ cupful water

Sauté the garlic, sliced pork, raddish, and soy beans in lard. Add 3 tablespoonfuls vinegar, salt, pepper, and water, and boil until the raddish is tender but not soft.

SOY BEANS WITH PIG'S BLOOD (DINUGUAN)

½ cupful boiled soy beans
4 tablespoonfuls pig's blood
¼ cupful chopped pork
2 tablespoonfuls chopped onion
2 tablespoonfuls chopped tomatoes
1½ tablespoonfuls vinegar
½ cupful water
¼ teaspoonful chopped garlic
1 tablespoonful lard
1 tablespoonful sugar
¼ teaspoonful pepper
1¼ teaspoonfuls salt

Soak the pork in 1 tablespoonful vinegar and 1 teaspoonful salt.

Sauté the garlic, onion, and tomatoes in lard. Add the pork and soy beans and fry 3 minutes longer. Add the water, sugar, pepper, 1 teaspoonful vinegar, ¼ teaspoonful salt, and the

blood, previously stirred with a fork. Cook slowly for five minutes without stirring.

TOKUA TOCHO WITH SOY BEANS

1½ cakes tokua, sliced into thin pieces, ½ inch long
½ cupful boiled soy beans
4 tablespoonfuls sliced pork
2 tablespoonfuls ginger cut in thin slices, ½ inch long
½ onion, sliced
4 sections garlic, chopped
4 tablespoonfuls chopped tomatoes
2 tablespoonfuls soy sauce
2 tablespoonfuls vinegar
1 teaspoonful tahuri
½ cupful water
3 tablespoonfuls lard

Fry the tokua, onion, and pork separately, in lard. Set them aside. Sauté the garlic, ginger, and tomatoes in lard. Add the soy sauce, tahuri, boiled soy beans, the fried tokua, pork, and onion, and ½ cupful water. Boil for 5 minutes. Then add the vinegar and continue cooking, without stirring, for 5 minutes.

TOKUA WITH LIVER

1½ cakes sliced tokua
¼ cupful sliced liver
2½ tablespoonfuls vinegar
2 tomatoes, sliced fine
1 tablespoonful lard
⅛ teaspoonful pepper
1½ teaspoonfuls salt
1 green pepper, sliced fine
½ onion, sliced thin, lengthwise

Soak the liver in 1½ tablespoonfuls vinegar with the salt and pepper. Fry the onion, tomatoes, liver, and green pepper in lard. Add 1 tablespoonful vinegar, a few pinches each of salt and pepper, and the sliced tokua. Let simmer until liver is tender.

SWEET PEPPER STUFFED WITH SOY BEANS

1 cupful boiled soy beans
3 sweet peppers
½ cupful ground pork
½ cupful sliced shrimps
3 tablespoonfuls soy sauce
3 tablespoonfuls chopped onion
2 tomatoes, chopped fine
1 egg
2 tablespoonfuls lard
1 tablespoonful chopped garlic
1 tablespoonful tikitiki flour
A few pinches of ground pepper

Sauté the garlic, onion, and tomatoes in lard. Add the shrimps and pork and fry for five minutes. Then add the soy beans, toyo sauce, and the ground pepper.

Roast the sweet pepper on charcoal, dip immediately in cold water, and peel. Remove seeds. Stuff the pepper with the above mixture. Roll in lightly beaten eggs mixed with tikitiki flour and fry in hot fat until brown.

EGGPLANT STUFFED WITH SOY BEANS

1 cupful boiled soy beans
¼ cupful ground pork
3 tablespoonfuls toyo
½ cupful shrimps, sliced fine
3 tablespoonfuls chopped onion
3 eggplants
1 egg
1 tablespoonful chopped garlic
1 tablespoonful rice bran
A few pinches of pepper
Lard

Sauté the garlic, onion, and tomatoes in lard. Then add the shrimp, pork, soy sauce, and pepper, and fry three minutes. Add the chopped soy beans and mix thoroughly.

Roast the eggplants over charcoal, dip in cold water, and peel. Remove the seeds. Stuff them with the above stuffing. Roll in lightly beaten egg previously beaten with the rice bran, and fry in hot fat until brown.

STUFFED TOKUA No. 1

2 cakes tokua
1 tablespoonful chopped onion
2 tablespoonfuls chopped tomato
2 sections chopped garlic
6 tablespoonfuls chopped fat pork
3 tablespoonfuls lean pork
¼ teaspoonful salt
1 tablespoonful lard

Divide tokua cake into 4 equal parts. Slice each part to 4 thin slices and soak these in vinegar a few minutes before using.

Sauté the garlic, onion, and tomato, in lard. Add the lean pork and then the fat pork and salt, and fry 2 minutes only.

Make sandwiches, using the slices of tokua in place of bread and the mixture as filler.

Wrap in omentum (unto sin sal) and fry in hot, deep fat until brown.

If omentum is not available, use lumpia wrappings instead.

STUFFED TOKUA No. 2

Divide tokua cake into 4 equal parts and slice each part very thin.

Make sandwiches using tokua slices in place of bread, and using the following filler:

2 tablespoonfuls green onion, chopped
1 egg
2 tablespoonfuls bread crumbs
2 tablespoonfuls chopped shrimp
10 tablespoonfuls fat pork
5 tablespoonfuls lean pork
2¼ teaspoonfuls or more of toyo sauce
2 pinches of pepper
2 pinches sugar

Mix.

Fill the tokua slices and wrap each with omentum (unto sin sal) or lumpia wrapping.

Steam 15 minutes. Fry in deep hot fat.

SOY BEANS A LA VALENCIANA

½ cupful boiled soy beans
1 sweet pepper, sliced in long, narrow strips
3 ripe tomatoes, chopped fine
2 sections garlic, chopped
1½ cupfuls boiled rice
½ onion, finely chopped
2 tablespoonfuls lard
½ teaspoonful salt
2 pinches pepper

Sauté the garlic, onion, and tomatoes in lard. Add the sweet pepper, soy beans, salt, pepper, and boiled rice. Fry about 5 minutes. Sprinkle some pimenton over it for coloring.

SOY BEANS WITH BANANA

½ cupful soy beans
¼ cupful saba banana, fried and sliced into small pieces
1 egg
¼ cupful chopped pork
2 tablespoonfuls chopped onion
1 teaspoonful salt
½ teaspoonful sugar

Mix the above ingredients and fill into the cups of a small muffin pan. Cook covered in boiling water about 25 minutes. Place in a hot oven to brown the top before serving.

SOY BEANS WITH TOYO

1 cupful boiled soy beans
2 tablespoonfuls toyo (soy sauce)
1 medium-sized onion, chopped fine
1 section garlic, chopped very fine
1 teaspoonful calamansi juice

Mix the sliced onion, chopped garlic, soy sauce, and calamansi juice with the soy beans and let the mixture stand 5 minutes. Cook the mixture in a covered pan until the onions are tender.

FRIED TOKUA WITH TOYO AND VINEGAR

1 cupful sliced tokua
2 tablespoonfuls sliced pork
½ sliced onion
1½ tablespoonfuls toyo sauce
½ cupful water
1 tablespoonful vinegar
Lard

Fry the tokua until somewhat brown and set aside. Fry the onion with the pork, then add the vinegar and toyo sauce. Cook 2 minutes without stirring. Add the water and boil until the meat softens. Add the fried tokua and continue boiling until a very small amount of the soup remains in the pan.

SOY BEANS WITH COCONUT MILK

1 cupful boiled soy beans
2 cupfuls coconut milk
3 sections garlic, pounded
A small piece of ginger, pounded
Salt to taste

Boil the coconut milk with the garlic, ginger, and salt, in a covered pan for 10 minutes. Add the soy beans and cook until the soup has been reduced to ⅕ its volume. Remove the garlic and ginger before serving.

SOY BEANS WITH SOTANGJON

1 cupful boiled soy beans
1 cupful of sotangjon cut to a length of ½ inch and soaked in water 10 minutes
4 tablespoonfuls sliced pork
2 tablespoonfuls sliced shrimps
2 tablespoonfuls chopped onion
2 tablespoonfuls chopped green onions
4 sections garlic, chopped
4 tablespoonfuls soy sauce
¼ teaspoonful pepper
2 cupfuls shrimp soup
2 tablespoonfuls lard

Fry the garlic, onion, pork, and shrimps in lard until brown. Add the soy beans, sotangjon, the shrimp soup, soy sauce, and pepper, and boil 10 minutes. Add the green onions, and boil 3 minutes longer.

SOY BEANS WITH BAKALAO

1 cupful boiled soy beans
½ cupful flaked bakalao (salt-codfish) soaked 2 hours in cold water before using
1 medium-sized onion, cut fine, lengthwise
A few pinches of pepper
3 sections garlic
2 sweet red peppers cut lengthwise into six parts
4 tablespoonfuls oil
4 medium-sized ripe tomatoes, chopped in pieces

Sauté the garlic, onion, and tomatoes in oil. Add the flaked fish, soy beans, pepper, and enough water to cover the mixture. Boil until a small portion of the soup is left. Drop in the sliced sweet pepper and continue cooking 5 minutes.

SOY BEANS WITH CURRY

¾ cupful boiled soy beans
¾ cupful sliced squash
¼ teaspoonful curry powder
½ cupful coconut milk
¼ onion, sliced into long thin, pieces
1 tablespoonful lard
¾ teaspoonful salt

Fry the onion in lard. Add the squash and the soy beans, and cook 10 minutes. Then add the coconut milk, the curry powder dissolved in a small quantity of water and salt, and boil 3 minutes.

SOY BEANS WITH ORANGE SAUCE

½ cupful boiled soy beans
¼ cupful orange juice
¼ teaspoonful grated orange rind
1 teaspoonful flour
1 teaspoonful butter
½ teaspoonful salt
2 pinches of pepper

Melt the butter and add flour, stirring constantly. Add salt, orange rind, and pepper. Then add the orange juice and cook until somewhat thick. Add the soy beans, and continue cooking for 2 minutes.

SOY BEANS WITH TOMATO SAUCE

½ cupful boiled soy beans
1 small onion, minced
2 sections garlic, chopped fine
⅓ cupful catchup
½ teaspoonful salt
A few pinches of pepper
2 tablespoonfuls lard

Sauté the garlic, onion, and soy beans in lard and add to it the tomato catchup, salt, and pepper. Cook, stirring constantly, for 5 minutes.

TOKUA WITH EGG SAUCE

1 cake tokua
1 medium-sized onion, sliced into thin narrow pieces
½ teaspoonful salt
2 sections garlic, chopped fine
1 large tomato
1 egg
¾ cupful water
2 tablespoonfuls lard

Slice the tokua cake into thin slices, 1 inch long, and ½ inch wide. Fry in hot fat until brown.

Fry the garlic, onion, and tomato in lard and add the salt and the fried tokua. Continue frying, stirring constantly, for 2 minutes. Finally add the water and let the mixture boil 2 minutes. While boiling, gradually add the well-beaten egg, stirring the soup while adding. Boil the whole mixture not more than 2 minutes.

SOY-BEAN BALLS WITH WHITE SAUCE

1 cupful boiled soy beans
4 tablespoonfuls bread crumbs
1 egg
1 tablespoonful butter
½ small onion, chopped fine
Salt and pepper to taste

Chop the soy beans and onion together. Add the melted butter, lightly beaten egg, salt, and pepper. Mix thoroughly. Shape into small balls, roll in bread crumbs, and fry in deep fat. Serve with white sauce made as follows:

WHITE SAUCE

Brown 1 tablespoonful of flour with ¼ teaspoonful salt and a few pinches of pepper in 2 tablespoonfuls butter. Add 1 cupful of soy-bean milk and cook until thick, stirring constantly to prevent lumping and burning.

SOY-BEAN BALLS

½ cupful boiled soy beans
1 egg
1 tablespoonful flour
½ onion, chopped into fine pieces
2 sections garlic, chopped fine
2 tablespoonfuls lard
1 teaspoonful salt
4 pinches pepper
1 cupful water
1 tablespoonful vinegar

Fry the soy beans and the chopped onion in 1 tablespoonful lard. Season with ½ teaspoonful salt and a pinch of pepper. Remove from the pan and cool. Beat an egg and thicken it with the flour. Mix it into the soy-bean mixture and form into little balls.

Fry the finely chopped garlic in 1 tablespoonful lard. Add 1 cupful of water, 1 tablespoonful vinegar, ½ teaspoonful salt, and 3 pinches of pepper, and boil without stirring for 3 minutes. Drop the balls in the boiling solution and cook about 5 minutes.

SOY-BEAN BALLS

½ cupful boiled soy beans
2 tablespoonfuls chopped pork
1 egg
2 tablespoonfuls flour
1 teaspoonful chopped green onion
1 tablespoonful sugar
1 teaspoonful salt
3 pinches ground pepper

Mix the above ingredients, form into small balls, and fry in deep fat until brown.

This may be served with catchup or with tomato sauce.

TOKUA CROQUETTES

1 cake tokua, mashed
1 medium-sized potato, boiled and mashed
1 small fish, fried and flaked
1 small onion, sliced fine
3 tomatoes, chopped fine
3 sections garlic, chopped
2 eggs
3 tablespoonfuls bread crumbs
½ teaspoonful salt

Sauté the garlic, onion, and tomatoes in 1 tablespoonful lard. Add the flaked fish and salt, and fry the mixture 2 minutes. Fry the mashed tokua in a small amount of lard and mix it with the mashed potato. Make oval croquettes of the above mixture, the tokua and potato, and roll the croquettes in lightly beaten eggs, then in bread crumbs. Fry in hot lard until brown.

SOY-BEAN TOKUA PIE

½ cupful boiled soy beans
1 cake tokua, chopped fine
2 tablespoonfuls chopped pork
1 tablespoonful chopped shrimp
½ onion, chopped fine
1 medium-sized tomato, chopped fine
1 tablespoonful seedless raisins
2 sections garlic, chopped fine
2 tablespoonfuls lard
½ cupful shrimp soup
1 teaspoonful salt
A few pinches of pepper

Fry the garlic, onion, and tomato in lard until brown. Add the pork, shrimp, soy beans, salt, and tokua and fry 5 minutes longer. Then add the pepper, seedless raisins, and shrimp soup, and cook 2 minutes. Use this mixture as filler.

Make the following crust:

1 cupful flour
5 tablespoonfuls butter
¼ teaspoonful salt
1 teaspoonful sugar

Sift the flour, sugar, and salt, and with the aid of a fork mix in the butter until the mixture becomes mealy. Gradually add

cold water until the dough clings together. Divide into 2 parts. Roll one part to 1/12 inch thickness and place in a buttered pan. Bake in a hot oven about 7 minutes. Cool and spread the above filler. Roll the remaining dough to 1/12 inch thickness and use this as the top crust. Bake in a hot oven 20 minutes, keeping the bottom heat very low.

SOY-BEAN FRITTERS

1 cupful boiled soy beans
¼ cupful soy-bean milk
½ cupful flour
¼ cupful tikitiki flour
6 tablespoonfuls sugar
1 teaspoonful baking powder
2 tablespoonfuls butter
2 eggs
½ teaspoonful salt

Cream the butter and sugar. Add the beaten eggs, salt, soy-bean milk, and boiled soy beans. Mix thoroughly. Add the flour, tikitiki flour, salt, and baking powder sifted together, and stir thoroughly. Drop by spoonfuls in deep, hot lard and fry until brown.

BAKED SOY BEANS

2 cupfuls boiled soy beans
3 thin slices of bacon
⅔ cupful catchup
1 heaping tablespoonful brown sugar
1 teaspoonful salt
¼ teaspoonful ground pepper
A few dashes of paprika
1 tablespoonful butter

Mix the above ingredients and bake in a moderate oven 30 minutes.

SOY BEANS AND MACARONI WITH CHEESE

1 cupful boiled soy beans
1 cupful boiled macaroni
¼ cupful grated cheese
⅛ teaspoonful pepper
½ teaspoonful salt
½ cupful catchup

Mix the macaroni, soy beans, catchup, pepper, and salt and a part of the cheese. Place in a baking dish and put the rest of the cheese on top of the mixture.

Bake 30 minutes in a moderate oven.

SOY BEANS AND MACARONI WITH TOMATO SAUCE

1 cupful boiled soy beans
1 cupful boiled macaroni
½ cupful tomato catchup or 1 cupful canned tomato
½ onion, chopped
1 tablespoonful butter
1 teaspoonful salt
¼ teaspoonful pepper
1 section garlic, chopped

Sauté the garlic, onion, and tomato in lard. Add the salt and pepper.

Place the soy beans and macaroni in alternate layers, in a baking dish, spread on butter, and pour tomato sauce over all. Bake 30 minutes.

SOY-BEAN AND TOKUA PANSIT

¼ cupful soy beans
½ cupful finely sliced tokua
½ cupful sliced pork
4 tablespoonfuls sliced shrimp
½ sliced onion
4 tablespoonfuls lard
6 tablespoonfuls green onion
3 sections garlic, sliced very thin
2 cupfuls mique
½ cupful stock (made from pork and shrimp)
2 tablespoonfuls toyo
1 egg, hard boiled
Salt to taste

Fry the mique in a small amount of lard; add 1 tablespoonful toyo sauce and set aside. Fry the sliced pork and the tokua separately. Sauté the garlic and onion; add the shrimp, pork, soy beans, tokua, 1 tablespoonful of toyo, and the soup, and cook until practically no soup remains. Add the mique and a few pinches of salt, if necessary, and place the mixture on a plate. Garnish by sprinkling over it the green onion leaves, cut fine, and the slices of hard-boiled egg.

SOY-BEAN LUMPIA

1 cupful boiled soy beans
½ cupful sliced boiled pork
½ cupful shrimp, sliced thin, crosswise
½ cupful sliced tokua
½ cupful sliced cabbage
1 chopped onion
1 cupful shrimp soup
2 sections garlic, chopped
2 tablespoonfuls lard
2 tablespoonfuls toyo

Sauté the garlic, onion, and shrimp in lard. Add the pork, soy beans, tokua, and toyo, and fry 3 minutes longer. Then add 1 cup of shrimp soup (made by pounding the heads of shrimps and boiling them in water), and boil until the soup is practically dry. Add the cabbage and boil 3 minutes longer.

Remove from the fire and wrap about 2 tablespoonfuls of the mixture in each lumpia wrapping.

Serve with pounded garlic and lumpia sauce made as follows:

8 tablespoonfuls water
1 tablespoonful brown sugar
4 tablespoonfuls flour
1 teaspoonful toyo

Make a smooth paste from the above by mixing all ingredients thoroughly and boiling the mixture, stirring constantly until thick.

FRIED SOY-BEAN LUMPIA

1 cupful boiled soy beans
4 tablespoonfuls pork, sliced fine
1 small onion, sliced fine
4 sections chopped garlic
2 hard-boiled eggs
1 cupful cubed tokua
½ teaspoonful salt
Lumpia wrappers

Wash and cut the tokua in small cubes. Sauté the garlic and onion; add the pork, soy beans, tokua, and salt, and cook 5 minutes. Lay aside. Slice fine the hard-boiled eggs and add them to the fried mixture. Wrap about 2 tablespoonfuls of the mixture in each lumpia wrapper, closing the ends. Fry in deep hot lard until brown and crisp, and serve hot with vinegar-garlic sauce made by pounding garlic, adding this to the vinegar, with salt and pepper.

SOY-BEAN CHOP SUEY

1 cupful boiled soy beans
½ cupful beef, sliced in small pieces
2 tablespoonfuls native celery (kinchay), cut in small pieces
½ teaspoonful cornstarch
¾ teaspoonful white wine
2 tablespoonfuls oil or lard
A few small slices of ginger
A piece of cabbage, cut in small pieces

Fry the cabbage, soy beans, and kinchay in the oil, for 3 minutes. Add enough water to cover. Drop the pieces of ginger, the pieces of beef previously rolled in the mixture of cornstarch, a few drops of oil, and wine, and cook the mixture until about dry.

Make the following gravy:

Dissolve 1 tablespoonful of cornstarch in 1 cupful of beef stock and boil the solution until thick. Season with 1 teaspoonful of sugar and ¼ teaspoonful salt.

Mix the gravy with the soy-bean mixture before serving.

TOKUA CHOP SUEY

- 1½ cupfuls sliced tokua (bean curd)
- ¼ cupful sliced pork
- ½ cupful sliced onion
- 2 tablespoonfuls toyo (soy sauce)
- Shrimp soup

Fry the onion, pork, and tokua for 10 minutes, stirring constantly. Add the soy sauce and enough shrimp soup, made from shrimp heads and shells, to cover the mixture. Boil 15 minutes.

Put in a deep dish and pour over it the gravy made as follows:

Dissolve 1 teaspoonful of cornstarch in 1 cupful of shrimp soup and bring to a boil. Add 1 teaspoonful of sugar, ¼ teaspoonful of salt, and ¼ teaspoonful of oil and cook the gravy until it thickens.

TOKUA-SOY-BEAN PANARA

- ½ cupful boiled soy beans
- ½ cupful finely sliced tokua
- ½ cupful boiled soy-bean sprouts
- ½ cupful shredded sweet potato
- 4 tablespoonfuls ground pork
- 4 tablespoonfuls chopped shrimp
- 1 small package seedless raisins
- 2 tablespoonfuls toyo sauce
- ⅛ teaspoonful pepper
- ½ onion, chopped fine
- 2 large tomatoes, chopped
- 2 sections garlic, chopped fine
- 3 tablespoonfuls lard

Fry the garlic, onion, and tomatoes in lard. Add the pork, shrimps, soy-bean sprouts, shredded sweet potato, toyo sauce, pepper, and cook 3 minutes. Then add the tokua, soy beans, and raisins, and continue cooking, stirring constantly 5 minutes more.

Use the above as filler.

Make the following dough:

1 cupful flour
⅛ teaspoonful salt
¼ cupful water
½ teaspoonful sugar
2 egg yolks

Sift the flour with salt and sugar, and add the egg yolks. Knead thoroughly. Then add the water to the dough and continue kneading until the dough is very fine and smooth.

Roll to a very thin sheet and cut to about 2 inches square. Place about 1 tablespoonful of the above mixture at the center of each square and fold the thin sheet of dough, bringing the sides together. Cut the edges to give the shape of a half circle. Seal the open sides by pressing them with the tip of a fork, and fry in deep, hot fat until crisp.

SOY-BEAN OKOY

¼ cupful boiled soy-bean sprouts
½ cupful tikitiki flour
½ cupful cornstarch
1½ cupfuls shrimp soup
1 egg
2 tablespoonfuls green onion leaves, cut fine
¼ cupful sliced shrimp
6 sections garlic, sliced very thin
Salt to taste

Mix the tikitiki flour and cornstarch, and suspend in the shrimp soup. Mix the egg and stir well. Add the onion leaves, soy-bean sprouts, salt to taste, and fry in deep, hot fat. When half cooked place a few slices each of garlic and shrimp on each portion and continue frying until brown.

SOY-BEAN KEKIAM

1 cupful chopped tokua
2 tablespoonfuls ground shrimp
1 teaspoonful green onion leaves, chopped fine
¼ cupful ground pork
2 eggs
¼ cupful flour
1½ tablespoonfuls toyo sauce

Mix the above ingredients and wrap in a piece of omentum (unto sin sal) to form a cylinder about 1 inch in diameter. Steam for 30 minutes. Cool and slice thin, crosswise. Fry in hot fat until brown. Serve with vinegar to which has been added chopped onion, salt, pepper, and a little sugar to taste.

SOY-BEAN SALAD WITH LETTUCE LEAVES

1 cupful boiled soy beans
½ cupful shredded lettuce
2 hard-boiled eggs
1½ tablespoonfuls vinegar
1 tablespoonful oil
1 teaspoonful salt
A few pinches of ground pepper

Mix the oil, vinegar, salt, and pepper, and add this to the soy beans and lettuce previously mixed. Mound the mixture in a plate and sprinkle over it the yolks of hard-boiled eggs passed through a coarse sieve. Slice the hard-boiled whites into small pieces and scatter on the mound of salad.

SOY-BEAN SALAD

1 cupful boiled soy beans
1¼ tablespoonfuls, calamansi juice
1 tablespoonful oil
½ onion, chopped fine
¾ teaspoonful salt
A few pinches of pepper

Gradually add the oil to the calamansi juice, stirring constantly. Add the salt and pepper.

Mix the soy beans and onion and pour the dressing over the mixture.

SOY-BEAN SALAD

½ cupful boiled soy beans
1 potato, boiled and cut into small cubes
½ cupful sliced string beans, boiled until tender
1 tablespoonful sliced sugar beets, blanched and cut into small cubes
1 tablespoonful green onion leaves, cut fine
1 tablespoonful sliced shrimp
¾ cupful mayonnaise
¾ teaspoonful salt
A few pinches of pepper

Mix the above ingredients thoroughly, and serve on lettuce leaves previously washed and blanched.

SOY-BEAN BISCUITS

⅓ cupful soy-bean flour
⅔ cupful wheat flour
1 egg yolk
⅓ cupful milk
2 tablespoonfuls butter or Crisco
2 teaspoonfuls baking powder
½ tablespoonful sugar
¼ teaspoonful salt

Sift the flours, baking powder, salt, and sugar, 3 times. Knead the mixture with the butter or Crisco.

Beat the egg yolk and add the milk. Add them to the flour mixture, mixing with a spoon to a soft dough. Toss on a

floured board and roll lightly to ½ inch thickness. Cut with a biscuit cutter and bake in a hot oven, 450° F. from 10 to 12 minutes.

Cookies No. I

PLAIN SOY-BEAN COOKIES

¼ cupful soy-bean flour
½ cupful wheat flour
⅓ cupful sugar
1 egg
⅓ cupful butter or lard
½ teaspoonful vanilla

Cream the butter and sugar and gradually add the well-beaten egg; then the flour and vanilla. Drop small portions from the tip of a teaspoon onto a buttered sheet and spread thin with a knife. Bake in a hot oven until brown.

Cookies No. II

SOY-BEAN COOKIES WITH PILI NUTS

Follow recipe for Cookies No. I, adding to the batter 3 tablespoonfuls of chopped pili nuts.

Cookies No. III

SOY-BEAN COOKIES WITH CANDIED ORANGE PEEL

Follow recipe for Cookies No. I, adding to the batter 3 tablespoonfuls of chopped candied orange peel.

Cookies No. IV

SOY-BEAN COOKIES WITH RAISINS

Follow recipe for Cookies No. I, spreading 2 or 3 seedless raisins on top of each cooky before baking.

SOY-BEAN-ROSELLE ROLL

½ cupful soy-bean flour
1 cupful wheat flour
1½ teaspoonfuls baking powder
¼ teaspoonful salt
3 eggs
¾ cupful sugar
5 tablespoonfuls milk
½ teaspoonful lemon or lime rind, grated

Sift the soy-bean flour, wheat flour, baking powder, and salt together 3 times.

Beat the egg yolks until light. Add the sugar gradually. Beat while adding. Then add the flour alternately with the milk, and finally the flavoring.

Fold in the whites of eggs beaten to stiffness, and pour the entire mixture into a low baking dish not more than ¼ inch thick. Bake from 6 to 10 minutes in a moderate oven, 325 to 340° F.

Invert the pan on a paper sprinkled with powdered sugar. Cut the sides of the cake, or the hard portions. Spread over it the roselle jam, and roll. After the cake has been rolled, roll a piece of paper around it to keep the cake in shape.

Cut crosswise before serving.

SOY-BEAN ANGEL CAKE

¼ cupful soy-bean flour
½ cupful wheat flour
Whites of 5 eggs
½ teaspoonful cream of tartar
½ cupful sugar
⅛ teaspoonful salt
⅔ teaspoonful vanilla extract

Beat the egg whites, add the cream of tartar, and beat hard until the mixture is stiff, but not dry. Add the sugar gradually, mixing it thoroughly with the whites.

Sift the two kinds of flour with the salt three times, and fold it in the whites. Add the vanilla extract and transfer to an unbuttered angel-cake pan and bake from 50 to 65 minutes in a low oven, from 275 to 300° F.

Do not disturb while baking.

Remove from pan while hot.

SOY-BEAN LAYER CAKE

¼ cupful soy-bean flour
⅔ cupful wheat flour
1 teaspoonful baking powder
3 tablespoonfuls cornstarch
¼ teaspoonful salt
6 eggs
1½ teaspoonfuls lime juice
3 tablespoonfuls water
1 cupful sugar
1 teaspoonful lime rind, grated

Mix the soy-bean flour, wheat flour, baking powder, salt, and cornstarch and sift three times.

Beat the egg whites until stiff.

Beat the egg yolks until thick. Gradually add the sugar and continue beating. Then add the lime juice, water, and the lime rind, and lastly the flour mixture, beating very lightly. Fold in the egg whites and transfer to well-buttered pans about ½ inch thick. Bake in an oven, 350° F., for 20 minutes.

Invert the pan while hot and place the layers on a wire basket to cool.

Fill between the layers with soy-bean cream, made as follows:

½ cupful soy-bean milk
½ cupful sugar
¼ cupful water
2 egg yolks

Boil the sugar and water to a medium thick syrup. Add the egg yolks beaten well with the milk, and cook to a thick consistency. Flavor with ½ teaspoonful vanilla.

This cream may be used as the frosting for the cake.

SOY-BEAN PUDDING

2 tablespoonfuls roasted soy beans
2 tablespoonfuls rice
1 cupful soy-bean milk
½ cupful water
2 egg yolks
4 tablespoonfuls milk or coconut milk
4 tablespoonfuls sugar or more if desired

Boil the rice and soy beans in the mixture of soy-bean milk and water, until the rice is soft. Add the sugar and continue boiling until the mixture is thick. Stir the egg yolk into the milk (coconut or canned) and add this to the boiled rice and soy beans. Mix thoroughly and transfer to a mold. Cook in a pan of boiling water for ½ hour.

Serve with medium thick syrup.

SAGO PUDDING WITH SOY-BEAN MILK

1 cupful soy-bean milk
1 tablespoonful sago
1 egg
2 tablespoonfuls sugar
A pinch, each, of nutmeg and salt

Boil the milk; add the sago, let it simmer gently, stirring constantly, until it becomes clear. Add the sugar and salt. Take the pan off the fire and let the mixture cool a few minutes. To the warm sago-milk mixture add the well-beaten egg and the nutmeg. Transfer to a buttered pan and bake in a moderate oven for 30 minutes.

SOY-BEAN PUDDING WITH SHREDDED COCONUT AND RAISINS

1 cupful soy-bean milk
½ cupful mashed soy beans
¼ cupful shredded coconut
¾ cupful sugar
2 eggs
1 tablespoonful seedless raisins

Beat the eggs lightly.

Mix all the ingredients together and stir in the beaten eggs. Pour into a buttered pan and cook in boiling water until thick. Transfer to a moderate oven and bake to brown the top.

SOFT CUSTARD WITH SOY-BEAN MILK

1 cupful scalded soy-bean milk
2 eggs
5 tablespoonfuls sugar
¼ teaspoonful salt
A pinch grated lemon peel

Beat the eggs slightly; beat in the sugar and the salt. Add the hot milk slowly, stirring constantly, and then add the flavoring. Line the mold with very thick carmelized syrup; pour the egg-milk mixture into the mold, and cover with the lid. Cook in a pan of boiling water for 30 minutes, at the end of which time, transfer it to an oven to brown the top.

SOY-BEAN-ORANGE CUSTARD

1 cupful soy-bean milk
2 eggs
5 tablespoonfuls sugar
1½ tablespoonfuls flour
5 tablespoonfuls orange juice

Beat the eggs, add the soy-bean milk, sugar, and orange juice, and mix thoroughly. Dissolve the flour in a small amount of water and add this to the milk mixture. Strain through a cloth and heat to the boiling point.

Line a mold with very thick carmelized syrup and pour in the milk mixture. Cook in a pan of boiling water until the milk solidifies. Place in a moderate oven to brown the top.

SOY-BEAN ISLAND

½ cupful soy-bean milk
½ cupful and 4 tablespoonfuls sugar
3 eggs
½ cupful water
A few drops of lemon extract

Separate the yolks and whites of the eggs. Beat the whites until stiff, add 4 tablespoonfuls sugar, and beat again until stiff. Boil the water and ½ cupful sugar and while boiling drop in the stiffly beaten egg whites by spoonfuls; turning each over after one minute of boiling.

Make the cream by adding soy-bean milk to the remaining syrup in which the egg white was cooked. Boil until thick. Add the slightly beaten egg yolks and cook until thick.

Pour the cream into a plate and place the whites, cooked in syrup, on it. Put about ¼ teaspoonful of the yolk-milk mixture on each mound of white, then top with a small amount of roselle jelly.

SOME COMMON FOODS MADE FROM SOY BEANS AND METHODS OF PREPARING THEM

I. SOY-BEAN MILK

Soy-bean milk was first extracted by Whai Nain Tze, a Chinese philosopher, long before the Christian Era. It is known to the Chinese as "fu chiang," or bean-curd sauce, and to the Japanese as "toniu," or milk from beans.

It is a white or creamy emulsion, of the consistency of milk, and has a characteristic odor and flavor, which may be masked by the addition of a small amount of vanilla extract or other flavoring extracts. It resembles animal milk in that the fat globules rise to the top on standing, it sours if left in a warm place; it is coagulated by certain mineral salts, rennet, pepsin, or acid; it can be condensed by evaporation; it can be fermented and used as buttermilk; and it may be used as milk in such preparations as cakes, cookies, chocolate, bread, custard, soups, biscuits, candies, etc.

In China and in Japan, many factories are dedicated to the manufacture of soy-bean milk. The Chinese and Japanese people use it for drinking purposes and for infant feeding. A small quantity of sugar is added to the milk when it is used as a beverage. It is said to rank close to mother's milk in infant feeding.

Doctor Tso, after conducting his experiments on rats, found that soy-bean milk compares with cow's milk in vitamin A content, and is richer in vitamin B. The experiment of Hill and Stuart of Harvard Medical School in feeding 40 babies with soy-bean milk indicated that the babies thrived. They took it

well, digested it, and gained on it. Since soy-bean milk is inferior to cow's milk in mineral content, the addition of 2 grams of calcium carbonate and 1 gram of sodium chloride (table salt) to every 100 grams of soy beans used for making milk will be needed, if the child is to be entirely dependent on this milk for its food supply.

In addition to its value as food for both young and old, it also serves to check the summer diarrhœa common to children. Sinclair (1916) in his experiments on babies who had diarrhœa and intestinal disturbances, found soy-bean milk to be very useful in curing the majority of cases.

TABLE 2.—*Composition of soy-bean milk and of cow's milk.*

Milk.	Protein.	Fat.	Carbohydrates.	Ash.	Other substances.	Water.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Soy bean.....	3.02–4.95	2.00–3.10	0.03–3.02	0.41–0.5	1.02–1.88	89.25–92.50
Cow's.....	3.05	4.00	5.00	0.70	1.19	86.06

METHOD OF PREPARATION

The method generally employed in the preparation of soy-bean milk is to wash the beans thoroughly and to soak them in plenty of cold water for 12 hours, changing the water frequently. Then the beans are ground in a stone mill, adding small amounts of water while grinding. (The total amount of water added is from three to five times that of the beans). The thin pastelike fluid is boiled about one hour and strained through a piece of cheesecloth to remove the impurities and the coarse particles. The filtrate, or the liquid passing through the cloth, is the soy-bean milk and the filter, or the solid collected in the cloth, is used as animal food. Block (1907) and Li Yu Ying (1911–12) claim that this filter does not even have traces of starch. Its composition, according to Block (1907), is 88.75 per cent water, .248 per cent nitrogen, .36 per cent ash, 0.04 per cent fat; and 10.85 per cent other substances.

The cake left after pressing the oil from the whole bean is also used for making soy-bean milk. To the meal or cake water

is added (five times the bulk of the meal). The mixture is boiled and strained through a piece of cheesecloth.

Aro Itano [4] claims that the following method of making soy-bean milk from soy-bean meal is better than the former: To the bean meal is added five times its bulk of water; it is then inoculated with *B. coli* and *B. lactis aërogenes* and left to stand 16 hours at room temperature. At the end of this time it is boiled one hour; filtered through a fine cheesecloth and to it is added salt in the proportion of one-half teaspoonful to one quart of the milk. Five per cent milk sugar is added if desired.

II. CONDENSED SOY-BEAN MILK

Condensed soy-bean milk may be prepared by adding 4 grams of dipotassium phosphate and 600 grams of sugar to 4 liters of soy-bean milk. It is then concentrated to a thick liquid in a vacuum.

The condensed soy-bean milk may be used as condensed animal milk in the preparation of chocolate, for sweetening coffee and tea, and for culinary purposes.

III. SOY-BEAN MILK POWDER

The soy-bean milk powder is very rich in fat and protein. According to Li Yu Ying and Grandvoinnet (1911–12) its composition is water, 7 per cent; protein, 46.04 per cent; fat, 27.60 per cent; carbohydrates, 12.36 per cent; and mineral salts, 6 per cent.

The method employed in preparing powdered cow's milk is employed in the manufacture of powdered soy-bean milk. The original method of manufacturing powdered milk was to pour small streams of the milk on the surface of hollow steel rollers revolving in opposite directions and against each other. The rollers are heated inside by live steam. They are so adjusted as to allow a thin film of milk to pass between them. The stream of milk instantly dries upon touching the hot rollers and the thin film of dry milk coating them is scraped off by sharp knives fixed to the upper side of the rollers. Some manufacturers evaporate the milk to a thicker consistency before passing it through the rollers.

[4] Bull. Mass. Agr. Exp. Sta. No. 182 (1918) 4.

The modern method of manufacturing powdered milk is by spraying or atomizing the liquid milk into dry air in the largest possible evaporating space, causing the moisture to separate from the milk and leave a dry powder. The milk is first condensed in a vacuum pan, then passed to sanitary tanks to which are attached sanitary pipes leading to the spray box. Through the "dry box," filtered, heated, dry air is circulated continuously and into this circulation of air the milk is atomized. Machines, consisting of a boiler to produce the steam for the coils to heat the air, filters for air filtration, and fans for circulating the air, are used in the manufacture of powdered milk. The moisture is taken up by the heated air and the atomized milk dries instantly in the form of flour or pulverized sugar and by gravity falls to the bottom of the drying box. The powdered milk is collected and packed in cans.

IV. SOY-BEAN CASEIN

Soy-bean casein is commercially manufactured in Cochin, China. The meal remaining after pressing the oil from the bean is ground through a stone grinder, water being added while the grinding takes place. Then the milky liquid is passed through a filter press. The residue is again ground with water. The milky fluid is heated in wooden vats, to the boiling point, and to it calcium sulphate is added in the proportion of 1 kilogram to 1,000 liters of milky fluid. The calcium sulphate precipitates the casein. This is collected by filtration through a fine cloth filter. It is purified by dissolving it in a very weak solution of sodium hydroxide and filtering. The casein is reprecipitated by the addition of acetic acid. The precipitate is collected by filtration and dried at a low temperature.

The soy casein may be used as a substitute for animal casein, such as in the preparation of breads, sauces, concentrated biscuits, etc. It is also used as a medium for paints and water proofing for textiles, size for paper, dressing for textiles, etc.

V. SOY-BEAN CURD

The soy-bean curd is known to the Chinese as "teou fu," to the Japanese as "tofu," to the Annamites as "dan phu," and to the Filipinos as "tokua," or "toqua."

The soy-bean curd was first produced by Whai Nain Tze, before the Christian Era and was introduced into Japan from China by the Buddhists. It was introduced into the Philippines by the Chinese and has become a very popular food in Manila and in places where there are Chinese who manufacture it for sale. "Tokua" on account of its high fat, protein, and mineral salts content, is called by the Chinese as "meat without bone," or "the poor man's meat."

Tables 3 and 4 will give the reader an idea of the value of "tokua" as human food.

TABLE 3.—*Composition of soy-bean curd.*

Tokua.	Fat.	Protein.	Ash.	Carbohydrates.	Water.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Tokua [a]	10.99	17.56	1.27	----------	72.10
Tokua [b]	3.67	10.11	0.95	3.42	81.87
Tokua [c]	3.38	6.29	0.58	1.64	88.11
Tokua [d]	5.25	7.41	1.08	----------	84.81

[a] Gibbs and Agcaoili (1912); [b] Adolph & Kiang (1921); [c] Piper & Morse (1923); [d] Konig (cited by Gibbs & Agcaoili (1912).

TABLE 4.—*Composition of soy-bean curd partially dried.*[a]

Soy-bean curd.	Water.	Protein.	Fat.	Ash.	Nitrogen free extract.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Sample [b]	41.75–43.25	24.83–24.97	12.59–12.62	13.35–17.67	3.13–5.84
Sample [c]	58.72–62.67	21.52–22.00	9.80–10.50	5.86– 5.99	0.15–2.79

[a] Natl. Med. Journ. of China, 6 (1920), 231. [b] Salted variety. [c] Unsalted variety.

The ash of the soy-bean curd, according to an analysis based on a moisture-free sample performed by W. H. Adolp and C. M. Wu,[5] contains 1.9 per cent of calcium oxide; 26 per cent of magnesium oxide, 0.3 per cent of potassium oxide, 0.03 per cent of sodium oxide, 2.28 per cent of phosphorus pentoxide, 0.01 per cent chlorine, 1.34 per cent of sulphur, and 0.01 per cent of iron. The coagulating medium used in the preparation of the curd analyzed was gypsum. The use of mother liquid of sea salt as coagulating agent would invariably increase the chlorine and sodium content.

[5] Natl. Med. Journ. of China 6 (1920) 233.

The first step in the manufacture of soy-bean curd is to make the milk from the bean. (The method has already been described.) Then the proteids are precipitated by the addition of a small quantity of mother liquid of sea salt, magnesium and calcium chloride solution, saturated solution of alum, or vinegar. Block (1906) has proven that chlorides and nitrates of calcium, barium, magnesium, and magnesium sulphate coagulate the soy-bean milk. Li Yu Ying and Grandvoinnet (1911–1912) coagulated the milk with rennet, while Piper and Morse (1923) coagulated it with 1 per cent solutions of acetic, tartaric, and lactic acids. Sour milk and the water drawn from the bean curd after coagulation may also be used as coagulants.

When complete coagulation has taken place, the water is thrown away and the white mass, while hot, is placed in square wooden trays, about 3 inches deep, and covered by a thin piece of cloth. The ends of the cloth are folded over and a flat weighted lid is placed on top to press out the excess water. Then the solid cake is cut into small squares and sold as soy-bean curd or soy-bean cheese.

We have found the method used by the Chinese in Manila to be simple and satisfactory. First the soaked soy beans are ground through a stone mill, water being added while the grinding takes place. The milk is diluted with hot water until the total amount of water used is three times the volume of the soy beans. It is then boiled for about an hour. The boiled milk is strained through a piece of fine cheesecloth. The solid portion collected in the cloth is dumped in a wooden barrel. This is sold as hog feed. To the liquid milky substance collected in another wooden barrel is added a small quantity of burnt gypsum (about 1.5 per cent by weight) suspended in hot water, and the mixture allowed to stand about thirty minutes. At the end of that time the milk has coagulated to a solid but soft mass about the consistency of a soft jelly. This is transferred to a shallow, wide basket lined with fine cheesecloth which allows the water to pass through. The white solid is then placed on a low table around which are seated on low benches Chinese

laborers who wrap about three-fourths cupful of the soft mass, or bean curd, in a square piece of fine cheesecloth, about the size of a small handkerchief. After several minutes standing the packages are unwrapped and rewrapped tighter in the same cloth. Then they are subjected to a very light pressure for a few minutes to get rid of the excess moisture. The bean curd or cheese is unwrapped, spread on shallow bamboo trays ("bilao") and partially dried at room temperature. Then they are dipped in a weak solution of turmeric to coat the outside with a light yellow coloring.

Some manufacturers soak the small cakes of curd in brine solution for a short time, then dip them in a solution of burnt sugar or molasses and bake them slightly before putting them on the market.

The amount of yield in the manufacture of soy-bean curd or "tokua" differs according to the amount of water used during the grinding and to the variety of bean used. In the commercial manufacture of "tokua", the general yield is about three and one-half times as much bean curd, by weight, as the original beans, or 50 grams of beans will yield about 175 grams of bean curd. Champion (1885) produced 185 grams of curd from 120 grams of beans; Paillieux (1880) produced one and one-half kilos of curd from one kilo of the beans. Morse [6] conducted a series of experiments on the yield of soy beans and found that the straw-yellow variety had the highest yield, or 34.3 grams of curd from 50 grams of beans and the black variety gave the lowest yield, or 14.1 grams of curd from 50 grams of beans. The low yield obtained by Morse as compared with the commercially produced curd is due to the fact that he pressed the moisture out more thoroughly from the curd than those sold commercially. The bean curd obtained by Morse when analyzed showed a content of from 31.94 per cent to 44.7 per cent protein, and from 13.55 per cent to 20.53 per cent fat.

On account of its high fat, protein, and mineral content; its high digestibility; its easy preparation; and its low market price, in comparison with meat or eggs, the soy-bean curd

[6] Piper and Morse, The Soybean Vol. I, 236.

becomes a very desirable food in the Tropics. Oshima (1905) found in his digestion experiments that 95 per cent of the protein, and about 95 per cent of the fat are digested. About 99 per cent of the total carbohydrates is digested if eaten with rice. If eaten alone the "tokua" was found to be less digestible.

Some common preparations made from soy-bean curd are "tahuri," frozen tofu, bean-curd brains, dry bean curd, thousand fold, fragrant dry bean curd, and fried tofu.

V-A. "TAHURI" OR "TAHULI"

"Tahuri" is manufactured in China and exported to the Philippines in large stone jars or in small tin cans. There are some "tokua" manufacturers in Manila that manufacture "tahuri" for local consumption.

Those that are imported from China are preserved in strong brine solution and the cakes are broken during the shipment so the liquid becomes like a thick emulsion containing pieces of the cured curd.

In Manila, the Chinese method of manufacture is to pack the large pieces of soy-bean curd, about 5 inches long, 4 inches wide, and 2.5 inches thick, with much crude salt, in empty gasoline cans. The curd is allowed to cure for a period of several months. During the curing period the bean curd changes from white to a brownish yellow color and develops a peculiar salty flavor to which the Chinese and many Filipinos are educated.

The composition of "tahuri" is shown in Table 5.[7]

TABLE 5.—*Composition of tahuri.*

Tahuri.	Water.	Protein.	Nitrogen.	Fat.	Sodium chloride.	SO_3
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Solid portion	55.76	14.56	2.33	7.12	12.7	.08
Liquid	57.86	9.56	1.53	2.09	16.38	.007

V-B. FROZEN TOFU

The frozen tofu is known to the Japanese as "kori tofu." The fresh bean curd does not keep more than two days at room

[7] Gibbs & Agcaoili, Philip. Journ. Sci. 7 (1912) 51.

temperature. One way of keeping it is by freezing. The bean curd is cut into small pieces and then frozen hard. The proteid shrinks when frozen and a porous cake is formed permeated with ice crystals. The frozen tofu is thawed out and dried in a vacuo. The dried product may be preserved indefinitely and used as fresh bean curd after soaking it in plenty of cold water.

V-C, BEAN-CURD BRAINS OR "TOFU NAO"

The bean curd brains known to many Filipinos as "tojo" is the unpressed soy-bean curd. The method of making "tojo" is almost the same as the method used in making "tokua", only that a smaller amount of the coagulating agent is used, and the very soft but solid mass formed is left undisturbed in the wooden container until used. The Chinese used to peddle this preparation in a wooden pail-shaped container, through different parts of Manila, but on account of the Philippine Health Service regulations, this product is now sold in the markets only.

The "tojo" is served with a few tablespoonfuls of medium thick brown-sugar syrup, which gives it flavor, the "tojo" being almost tasteless. Sometimes it is eaten with sweet oil, sauce, and vinegar, or with finely cut meat and spices.

V-D, DRY BEAN CURD

The fresh bean curd when dipped in burnt millet-sugar sauce and rubbed with fine salt will keep longer than the "tokua" and is called "topu khan." This preparation is usually eaten in soups.

V-E, FRAGRANT DRY BEAN CURD

The fragrant dry bean curd is so named from the fact that it has the consistency of smoked sausage called "hsiang khan" or fragrant dry.

It is made by subjecting the fresh bean curd to great pressure, which eliminates much of the water content. The pieces of semidry curd are soaked in a weak brine solution in which is dissolved burnt millet-sugar and to which is added powdered spices. The curd is then dried to hardness. This preparation keeps indefinitely and is used in soup making and in vegetable dishes.

V-F. THOUSAND FOLDS

Thin layers of fresh bean curd are placed on cheesecloth, one on top of another, and then subjected to a great pressure. The thin layers of curd are dried partially and are rolled together like jamrolls. Then they are cut into strips and served in soups as noodles. On standing, the thousand folds mold and develop a meatlike flavor. This is fried in sesame oil and served in place of meat.

V-G. FRIED BEAN CURD

One of the commonest foods in China is the fried bean curd. The cake is cut into small squares and fried in deep fat until they will float. These are collected and fastened on a string of bamboo fibers. The fried bean curd is generally eaten with syrup and served between meals. It is said to supply energy to hard-working people.

VI. SOY SAUCE

The soy sauce is called by the Chinese, "ch'au yau," or drawing oil; or "pak yau" or white oil; by the Japanese, "shoyu"; and the Filipinos, "toyo."

The soy sauce is a dark brown salty liquid with a peculiar meat-extract flavor. It is very popularly used in China, Japan, India, Java, Philippine Islands, and wherever there are Chinese restaurants. The soy sauce is known to many Americans and Europeans who frequent the chopsuey houses. Chinese records show that the soy sauce has been used in China for over 3,000 years. It is estimated that each Japanese consumes 2.5 ounces of soy sauce per day.

Table 6 shows the food value of soy sauce.[8]

TABLE 6.—*Composition of soy sauce or shoyu.*

Specific.	Water.	Protein.	Carbohydrates.		Free acid (as lactic).	Ash.	Salt.	Phosphoric acid.*
			Glucose.	Dextrin.				
Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
1.185	62.39	9.28	2.70	0.69	1.18	18.48	16.03	0.53
1.190	62.82	9.53	3.33	0.69	1.33	18.70	15.67	0.51
1.208	60.58	9.15	5.85	1.43	0.92	20.14	17.47	0.46
1.230	60.08	6.75	3.33	1.10	0.80	----------	23.01	0.39

[8] Piper & Morse, The Soybean, 1st Edition, (1923) 257.

Table 7 shows the composition of "toyo" prepared in Manila.[9]

TABLE 7.—*Composition of toyo prepared in Manila.*

Sauce.	Water.	Protein.	Acidity as acetic.	Reducing sugar (convert sugar).	Sucrose.	Ash.	Sodium chloride.	Undetermined. Probably fat.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Toyo	65.26	.75	0.00	2.59	3.25	27.47	24.86	.68
Toyo [a]	58.31	4.93	1.68	9.50	.....	24.74	20.12	2.52

[a] Toyo made with sugar.

METHOD OF MAKING SOY SAUCE

The general method of making soy sauce used in China, described by Elizabeth H. Groff, is as follows:[10]

About 933 pounds of soy beans are soaked overnight, placed with plenty of water in a boiler and boiled until very soft. They are drained in large bamboo baskets. After draining them well and when the beans are almost cold they are poured on a mixing board and 800 pounds of flour is thoroughly mixed with the beans by hand, until each bean is covered with flour. The bean-flour mixture is then spread on trays to about 1.5 inches thick and the mixture furrowed by hand so the beans get the proper ventilation. The trays containing the soy-bean-flour mixture are placed in the mold room from one to two weeks. In about three days mold begins to grow on the beans. The mold is of yellowish green color and is a species of "Aspergillus." Sometimes an undesirable black mold grows. This should be removed as soon as seen in order to prevent it from spreading. The molded beans from the original 933 pounds of boiled beans and 800 pounds of flour are divided into 18 equal parts and each part is placed in a wide mouthed stone jar and covered with a salt solution made from about 100 liters of water and 53⅓ pounds of salt. The jars are allowed to stand in the yard to sun for a period of from two to six months or longer, the longer the period the better. The jars are covered

[9] Gibbs, Agcaoili, and Shilling, Philip. Journ. Sci. 7 (1912) 399.

[10] Soy Sauce Manufacture In Kwangtung, China, Philip. Journ. Sci. 15 (1919) 307–314.

at night and when it rains to prevent adulteration. During the sunning period the mixture is stirred from time to time. Some of the liquid is lost by evaporation during sunning and this is replaced by salt solution three days before the first drawing off of the soy sauce. About 80 pounds of soy sauce is siphoned in the first drawing. This liquid is allowed to stand to allow the solid particles to settle to the bottom and the clear supernatant liquid is separated by decantation or siphoning. The liquid is generally reduced from 80 pounds to 66⅓ pounds. The first drawn soy sauce is called "teng ch'au" meaning first drawing and the material remaining in the jar is called "teng shi", or "first salted". This is used as the base of various other sauces or as the base for the second drawing. The first drawing is placed in clean jars and sunned again from several months to several years depending on the quality of sauce the manufacturer wishes to produce. It is said that 5 years sunning will produce an extra quality sauce.

Generally, second, third, and fourth drawings are made. The second drawing is obtained by adding to the bean, or first salted, about 100 liters of water and 40 pounds of salt and allowing the jar to sun about three months. At the end of this time the second drawing is made, the procedure being the same as the first already described. The third and fourth drawings are made in the same manner as the first and the second drawings. The material remaining in the jar after the fourth drawing is sold as a cheap sauce or used as base for cheap sauces.

The first drawing is boiled at least two hours and bottled. It is sold at the highest price. The second drawing next highest, and so on. Often times the second, third, and fourth drawings are mixed and sold at a much cheaper price than the first drawing. Some manufacturers do not observe the sunning method for the second, third, and fourth drawings. In this case the beans are placed in a pan and boiled for at least three hours. Then they are allowed to cool and treated with salt. Candied molasses is sometimes added as a coloring and sweetening agent.

The following method of making soy sauce is an extract of the method described by Margaret B. Church.[11]

Soak the soy beans in plenty of water for about twenty hours, changing the water frequently to prevent fermentation.

Boil the beans to softness and drain well.

Spread the beans, in about a one foot layer, on a large tray-like platform to cool; turn the beans from time to time to hasten the cooling.

Roast wheat until crisp and crush evenly.

Mix the boiled beans and crushed wheat thoroughly in the proportions of from two parts of wheat to six parts of beans or from three parts of wheat to six parts of beans. The mixing must be done so that each bean may be coated with wheat.

Inoculate with mold sold commercially in Japan as "tane koji" *Aspergillus flavis* Link. or *A. oryzae* (Ahlb.) Cohn and distribute the mixture in flat trays. Place the trays in the "koji" room, or mold room where the temperature is kept constant at 24° to 25° C.

After eighteen hours examine the trays. The temperature of the "koji" should not be above 29° C. A higher temperature is due to serious bacterial contamination. Stir the "koji," bringing the bottom to the top, and breaking the beans apart. Heap the "koji" in two piles extending the length of the tray instead of spreading it evenly on the tray. Place the tray again in the mold room the temperature of which is now kept at 30° C.

Stir again after eighteen hours and break the beans apart. Cool the mass to 24° C. After a thorough stirring, form four furrows of the beans, running the width of the tray, and return the trays to the mold room.

After fourteen hours from the last stirring examine the "koji" again. It should have a yellow coating of the fruiting heads of *Aspergillus*.

[11] Soy and Related Fermentations, U. S. Dept. of Agr. Bull. 1152 (1923).

Empty the "shoyu koji" in a tub containing salt solution of 20° to 22°. In Japan the brine is made by dissolving one part of sea salt to two parts of water. Sea water is often used. The mash composed of molded beans and brine is called in Japan as "shoyu moromi."

On the first day inoculate the tub of "shoyu moromi" with four flasks, each containing 450 cubic centimeters, of wort extract broth and 5 per cent salt solution with a yeast culture, Zygosaccharomyces sp.

Start a new batch of "shoyu-koji" and empty a mature batch into the mash vat each day. Mature "koji" mixed with brine solution forms the "shoyu-moromi."

Let the tub of "shoyu-moromi" stand about ten months, stirring the mash daily and passing a blast of air into the material to supply oxygen to the microörganisms.

Press the mash and boil the soy sauce about two hours before bottling.

Nashimura claims that during the ripening process the powerful enzymes of *Aspergillus oryzae* act upon the carbohydrates and products of the wheat and soy beans and develop an agreeable flavor. He also found that the time of manufacture may be shortened by milling the roasted wheat and boiled soy beans thoroughly, by applying a temperature of not less than 35° and not more than 40° C., and by adding alcohol directly. With this method, the length of time of manufacture is shortened to five weeks only.

Oshima (1905), however, claims that during the ripening process the chief chemical changes that take place result from the action of proteolitic and diastatic ferments, and from the alcoholic ferments. Part of the proteid materials of the beans are converted to more soluble forms by proteolitic ferments. Glucose is produced from the diastatic fermention. The alcoholic fermentation is noticeable only in the early stage of manufacture. The alcohol produced is decomposed and acid and other products are produced which accounts for the agreeable flavor of the soy sauce.

VII. "NATTO"

"Natto" is a popular food among the Japanese people. It is used as a side dish and as a material in the preparation of confections. Its average composition is water, 61.84 per cent; albumen, 19.26 per cent; fat, 8.17 per cent; carbohydrates, 6.09 per cent; cellulose, 2.8 per cent; ash, 1.84 per cent. From these figures it may be easily seen that "natto" is highly nutritious. Besides, it is more digestible than boiled soy beans since it is softer and contains more peptone.

"Natto" may be made by boiling the soy beans to softness, and while hot, small portions are wrapped in rice straw. The bundles are tied at both ends and placed in a closed room where the temperature is kept from 35° to 40° C. for twenty-four hours. The beans ferment and become a thick viscid mass with a peculiar odor.

VIII. "HAMANATTO"

"Hamanatto" is another Japanese preparation made from soy beans. It is of a brown color, of sticky consistency, with a salty taste, and has an odor similar to the fresh crust of brown bread.

It is prepared by boiling the beans to softness, then spreading them on straw mats, and mixing with them wheat flour in the proportion of six parts of flour to ten parts of beans. When the molds grow on the mixture it is sunned for three days. On the twelfth day ginger and salt are added and the mixture is kept in tubs for a period of thirty days. A weight is placed on top of the mixture while standing in the tub, which makes it compact.

Sawa [12] found "hamanatto" to contain water, 44.73 per cent; albuminoid nitrogen, 3.57 per cent; fat 3.44 per cent; fiber, 6.87 per cent; total carbohydrates, excluding cellulose, 8.40 per cent; total ash, including salt added, 18.54 per cent. He also found that at least three different kinds of bacteria are present in this product.

[12] Cited by Piper and Morse, The Soybean, 1st Edition (1923) 245.

IX. "YUBA"

"Yuba" is popular among both Chinese and Japanese. It is a thin, glossy, cream yellow brittle sheet very rich in protein. It is used in soups, as a wrapper, or fried.

"Yuba" is prepared by boiling soy-bean milk for about an hour. Then a small quantity of auramine is added. A thick film is produced on the surface. This is removed by passing a stick underneath the surface. It is dried over a charcoal fire.

Table 8 shows the composition of "yuba" according to analyses made by Oshima and Nagao.[13]

TABLE 8.—*Composition of yuba.*

Authority.	Water.	Protein.	Fat.	Carbohydrates.	Ash.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Oshima	18.31	49.65	18.0	11.82	2.22
Nagao	22.85	51.60	15.62	7.31	2.82

X. "MISO"

"Miso" is daily consumed by the population in the rural districts of Japan. It is estimated that each person consumes an average of 40 grams of "miso" per day.

The two most important kinds of miso are the white and red "miso." The white "miso" contains a small amount of salt and is fermented with rice "koji" for a period of four days only. It keeps only about ten days. The red "miso" is red in color, is more salty than the white "miso," and is fermented with barley "koji" for from one and one-half to two years. It keeps indefinitely. The composition of white and red "miso" is shown in Table 9.[14]

TABLE 9.—*White and red miso.*

Kind of Miso.	Water.	Dry matter.	Water soluble (cold).	Protein.	Fat.	Fiber.	Starch dextrin etc.	Glucose.	Alcohol.	Sodium chloride.	Ash.
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
White	59.27	39.78	22.13	10.18	5.10	1.99	6.31	8.32	0.95	5.99	7.78
Red	50.16	48.66	32.98	12.48	6.46	2.31	2.72	10.40	1.18	10.84	12.48

[13] Cited by Piper and Morse, The Soybean, 1st Edition (1923) 247.

[14] Kellner (1889); cited by Piper and Morse, The Soybean, 1st Edition (1923) 250.

"Miso" is generally prepared by steaming the beans twenty-five hours. They are cooled and rubbed to a thick, uniform paste. To this paste is added the proper amounts of powdered "koji," salt, and water and the mass mixed thoroughly. This is placed in a wooden vat and the vat kept at a room temperature of 15° to 20° C.

If white "miso" is desired a small amount of salt is used. Rice "koji" is used to produce the flavor desired.

"Miso" is used in soup making, in cooking vegetables, in flavoring dishes, and in pickling vegetables.

The "koji" used for manufacturing "miso" is similar to that used in making "sake," a wine made by the Japanese from rice. It consists of barley or rice with a culture of *Aspergillus oryzae*, which contains diastatic, proteolitic, and inverting ferments.

XI. SOY-BEAN FLOUR

Soy-bean flour is made by grinding the dried soy beans or the press cake remaining after the oil has been pressed from the bean. It has become an important source of food for persons requiring a low starch diet, as diabetic patients, etc. In England there is on the market soy flour composed of 25 per cent soy-bean flour and 75 per cent wheat flour. This is being used in making soy bread. In Amsterdam soy biscuits are manufactured from this flour, which are being exported. In the United States soy-bean flour is also on the market. Soy-bean flour, with gluten, makes satisfactory bread, muffins, crackers, biscuits, macaroni, and several other preparations, as specialties for diabetic persons.

According to the findings of Bowers (1919) the protein of the soy-bean flour, if thoroughly cooked, is 91 per cent digestible; the carbohydrates about 94 per cent digestible.

Table 10 shows the composition of soy-bean and some other common flours on the market.[15]

[15] Piper and Morse, The Soybean, 1st ed. (1923) 224.

TABLE 10.—*Composition of soy-bean flour in comparison with wheat flour, corn meal, rye flour, graham flour, and whole-wheat flour.*

Flour or meal.	Constituents.					
	Water.	Ash.	Fat.	Fiber.	Protein.	Carbohydrates.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Soy-bean [a]	6.14	5.24	20.71	1.72	39.56	26.63
Soy-bean [b]	6.10	6.20	4.50	2.05	47.30	33.85
Wheat	12.00	0.45	1.00	0.20	11.00	77.35
Corn meal	10.00	0.90	2.70	0.80	8.50	77.10
Rye	9.00	1.10	1.50	0.65	12.00	75.85
Graham	9.60	1.80	2.20	1.90	12.60	71.90
Whole wheat	10.90	1.05	2.00	1.00	12.00	73.05

[a] Flour made from the whole bean. [b] Flour made from soy-bean cake. Analyses made by Bureau of Chemistry, U. S. Department of Agriculture.

XII, SOY-BEAN OIL

The soy-bean oil is obtained from the bean by expression. The soy oil belongs to the semidrying class. It resembles cotton-seed oil in some respects and in its physical properties that of linseed oil. The crude oil is from yellow to dark brown color and has a faint beany odor. After refining and deodorizing it, it becomes lighter in color and nearly odorless and tasteless. It is used in the manufacture of lard and butter substitutes, and salad oils. It is also being very satisfactorily used in the manufacture of soaps on account of its low content of free fatty acids and unsaponifiable matter; and is also used in paints; waterproof goods; printing inks; lubricating; lighting; candle making; the manufacture of artificial rubber; the manufacture of linoleum; toilet powder; etc.

XIII, SOY-BEAN MEAL

The cake remaining after the oil has been expressed from the bean is the meal. It is used as stock feed, fertilizer, and human food. Its composition is as follows: water, 7.59 to 17.37 per cent; protein, from 40.8 to 44.65 per cent; fat, 5.04 to 8.77 per cent; nitrogen-free extract, 21.12 to 30.89 per cent; ash, 4.90 to 6.59 per cent; fiber, 3.58 to 6.95 per cent.

The soy-bean meal when ground to a fine powder makes a fine flour for preparations that require a low starch content. It is also used for the preparation of soy-bean curd and soy-bean milk.

XIV. SOY-BEAN COFFEE

The soy bean when properly roasted and prepared makes a drink very similar to coffee in appearance and in flavor. This is being extensively used in Europe, especially in Switzerland, and in the United States, as a coffee substitute. In Japan and Russia roasted soy beans or soy-bean coffee is put up in small packages and sold as coffee.

XV. SOY-BEAN SPROUTS

Soy-bean sprouts may be grown by first thoroughly washing the beans and soaking in water several hours. They are then transferred to an earthen jar that contains a hole in the bottom for draining the excess of water, and this is lined with either a piece of bamboo mat or cloth. The beans are then covered with straw to keep out the light. They must be moistened at least three times a day. In about four to five days the sprouts are fully grown and ready for cooking. The soy-bean sprouts may be used in any way that green vegetables are used.

Table 11 shows the composition of soy-bean and mung-bean sprouts.[16]

TABLE 11.—*Composition of soy-bean and mung-bean sprouts.*

Bean.	Water.	Nitrogen material.	Fat.	Carbohydrates.	Mineral salt.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Soy	66.98	14.73	5.95	4.04	3.41
Mung	91.21	3.41	0.28	2.12	0.48

[16] Piper and Morse, The Soybean, 1st Edition, (1923) 227.